

18. Elucidate the methods involved in the synthesis of gold and silver nanoparticles with smaller dimension of <10 nm?
19. Discuss about p and n- type semi-conductors with examples. How to measure the band gap for the semiconductors?
20. Describe the principle, instrumentation and applications of AFM.
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NOVEMBER/DECEMBER 2025

**23PECH13B — NANO MATERIALS AND
NANO TECHNOLOGY**

Time : Three hours

Maximum : 75 marks



SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

Write any two synthesis techniques in nanotechnology.

2. Differentiate between 1D and 3D nanomaterials.
3. Write a note on solvothermal method.
4. How the crystallinity of the nanomaterials can be improved?
5. List out the thermal properties of silica, iron and alumina nano materials.
6. Highlight the mechanical properties of different nanomaterials.

7. State Hall Effect.
8. How the role of impurities alters semiconductor properties?
9. What is the need for TEM study for any nanomaterials?
10. What do you understand by the term nano composites?

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions.

11. (a) Discuss the features and background of nanostructures with specific examples.

Or

- (b) How to prepare 0D, 1D, 2D and 3D nanomaterials? Give examples for each.

12. (a) Highlight the working principle of hydrothermal and CVD methods.

Or

- (b) Explain the sol-gel process for nanomaterials synthesis.

13. (a) Define friction. Elucidate the consequences of minimizing friction.

Or

- (b) Compare the thermal properties of gold, silver and metal oxides nanoparticles.

14. (a) How does photogalvanic cell work? Explain it briefly.

Or

- (b) Elaborate the different types of semiconductors and its applications.

- (a) Describe the principle, instrumentation and applications of TEM study.

Or

- (b) Explain the importance of SEM characterization. How samples could be prepared for these studies?

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Briefly explain about bottom up and top-down synthesis process of nanomaterials.

17. Explain the microwave assisted and electrochemical synthesis methods in detail with examples.

